MA 227, CALCULUS III

Spring, 2010

Name (Print last name first): .....

Student Signature: .....

TEST I

10 questions, 10 points each. SHOW ALL YOUR WORK!

Question 1

Calculate the cross product of $\mathbf{r}_1 = (2, -1, 1)$ and $\mathbf{r}_2 = (3, 1, -2)$.

Answer: .....

Question 2

Let $\mathbf{r}(t) = (3t^{1/3}, e^{t^2-1}, 2t)$. Find $\mathbf{T}(1)$.

Answer: .....

Question 3

Let $\mathbf{r}(t) = (t^3, t-1, t^2)$. Find normal plane at point $t = 1$.

Answer: .....

Question 4

Let $\mathbf{r}(t) = (\cos(t), t, t^2)$. Find curvature κ at point $t = 0$.

Answer: .....

Question 5

Find the area of the parallelogram generated by the vectors $(1, 2, -1)$ and $(-1, 1, 2)$.

Answer: .....

Question 6

Find the equation of the plane containing the points $(1, 2, 3)$, $(1, 1, -1)$ and $(-1, 2, 1)$.

Answer: .....

Question 7

A particle moves with position function $\mathbf{r}(t) = (t, \sin(t), e^{-t})$. Find velocity, acceleration and tangential and normal components of acceleration at point $t = 0$.

Answer: .....

Question 8

Let $f(x,y) = e^{x^2y} + y^2\ln(x)$. Find partial derivatives f'_x and f'_y.

Answer: .....

Question 9

Let $f(x,y) = x\cos(y) - x^2y^3$. Find all second partial derivatives: $f''_{xx},\ f''_{xy},\ f''_{yy}$.

Answer: .....

Question 10

Let $f = xyz$ and $\mathbf{F} = (xyz,\, y,\, z^2y)$. Find ∇f, $\operatorname{div}\mathbf{F}$ and $\operatorname{curl}\mathbf{F}$.

Answer: .....